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Legislation for the Adirondacks.

FOUR bills prepared by the New York Forest Commission have been introduced in the Legislature.

The first authorizes the purchase of lands located within such counties as include the Forest Preserve. This provides that the Forest Commission, with the approval and concurrence of the Commissioners of the Land Office, may purchase lands in these counties at a price not to exceed one dollar and fifty cents per acre, and that no purchase of lands shall be made in excess of previous appropriations for that purpose.

The second amends the law regarding the formation and regulation of railroad corporations, so that Section 25 shall read as follows:

The Commissioners of the Land Office shall have power to grant to any railroad company formed under this Act any land belonging to the people of this State which may be required for the purposes of their road, on such terms as may be agreed on by them; or such company may acquire title thereto by appraisal, as in the case of lands owned by individuals; and if any land belonging to a county or town is required by any company for the purposes of the road, the county or town officers having the charge of such land may grant such land to such company for such compensation as may be agreed upon. The land included in the State Reservation at Niagara, and the Concourse land on Coney Island, and such lands as are included in the Forest Preserve, and that now are or that hereafter may be placed in the care, custody and control of the State Forest Commission, are expressly exempted from the provisions of this Section.

The third provides for a change of venue by amending the Code of Civil Procedure in certain cases; and the fourth amends the Act establishing the Forest Commission, so that Section 20 of Chapter 283 shall read as follows:

Every supervisor of a town in this State, excepting within the counties mentioned in Section 7 of this Act, shall be *ex officio* fire-warden therein. But in towns particularly exposed to damages from forest-fires the supervisor may divide the same into two or more districts, bounded as far as may be by roads, streams of water, or dividing ridges of land or lot lines, and he may, in writing, appoint one resident citizen in each district as district fire-warden therein. A description of these districts, and the names of the district fire-wardens thus appointed shall be recorded in the office of the Town Clerk. The supervisor may also cause a map of the fire districts of his town to be posted in some public place, with the names of the district fire-wardens appointed. The cost of such map, not exceeding five dollars, shall be made a town charge, and the services of the fire-wardens shall also be deemed a town charge, and shall not exceed the sum of two dollars per day for the time actually occupied in the performance of their duties as such fire-wardens. The services of the persons who may assist in extinguishing a forest-fire shall also be a town charge, and shall not exceed the sum of one dollar per day for each person employed; but all bills for such services must be approved by the fire-warden of the town in which the fire occurred, before payment shall be made. It shall be the duty of the Board of Auditors in each town to promptly examine, audit and allow all reasonable bills presented to them by fire-wardens for services and disbursements under this Act, and for the payment of persons assisting in extinguishing forest-fires. Within the counties mentioned in Section 7 of this Act, such persons shall be fire-wardens as may from time to time be appointed by the Forest Commission. The persons so appointed shall act during the pleasure and under the direction of the Forest Commission. Upon the discovery of a forest-fire, it shall be the duty of the fire-warden of the district, town or county to take such measures as may be necessary for its extinction. For this purpose he shall have authority to call upon any person in the territory in which he acts for assistance, and any person shall be liable to a fine of not less than five nor more than twenty dollars for refusing to act when so called upon.

The most important of these measures is the one providing for the purchase of lands for the forest preserve. If the State is to own any land at all, it should gradually acquire title to the tracts lying between the blocks of land now held by the state. It should make a beginning with a small appropriation, and while wisely caring for what is already in its possession, should purchase such lands as can be cheaply acquired, and which are so situated that their acquisition would lessen the danger from forest-fires, and render the guardianship of the state lands more convenient and effective. It is most desirable that all the people of New York should come to have a more vital sense of proprietorship and responsibility regarding the property of the state in the Adirondack region, and an appropriation for the purchase of additional land would doubtless tend to produce this effect. All observers of the mountain forest-regions of the state unite in testifying that whatever the disposition or wishes of a railroad company may be, the extension of the road through new portions of the wilderness is usually followed by the denudation and ruin of large tracts of valuable forest-land. As the timber becomes accessible it is cut off without regard for the future, and much of the land is burned over so that forest-conditions are permanently destroyed. To prevent the farther extension of railroads over state lands would save more of the forests which still remain on these lands than any other measure that can be devised.

The bill providing for a change of venue in suits for trespass on state lands is necessary to an effective administration of the laws. Such cases cannot always be fairly tried in the vicinage where the depredations were committed. The apprehension has been expressed that some provisions of the Fire Warden Act might induce public-spirited citizens to rally for the extinguishment of fires in such numbers as to place a serious burden upon taxpayers, but some risk must be taken to secure the maximum of efficiency. On the whole the proposed legislation seems wise, and the bills should command the support of the press and the people of the state.

One of the most interesting botanical results certainly, obtained by Dr. Henry during his residence in western China, is the establishment of the fact that the Tulip-tree is an inhabitant also of that country. That monotypic species occur in eastern America and in eastern Asia is no new fact, but the plants common to the two regions discovered up to this time have been unimportant herbs, and the Tulip-tree is the first instance recorded of a

tree found in them both; and a tree, in spite of the long period of its cycle of existence, would be expected, from its greater exposure to climatic changes, to undergo greater modifications than a smaller plant. The presence of the same tree in Asia and in America is remarkable, perhaps, but it is not remarkable that Tulip-trees should grow in these two remote regions. It would be remarkable if one was not found in Asia in view of the similarity of the two floras, and of the fact that Tulip-trees of many species were at one time in the world's history widely distributed over its surface. The chief significance at this time, therefore, of Dr. Henry's discovery is that the climatic conditions of eastern North America and central China are so nearly identical that the descendants of a common tertiary ancestor —one in America, the other in China—have not become sufficiently altered during all the centuries they have existed to furnish to the eye of the systematic botanist differences sufficiently marked to enable him to separate them specifically. But we will refer our readers to the following account of the Chinese Tulip-tree, contributed to the columns of the *Gardeners' Chronicle* by Mr. W. Botting Hemsley, the author of the exceedingly valuable catalogue of Chinese plants now being published in the *Journal of the Linnæan Society*:

It is just thirty years ago that the late Dr. Asa Gray published his memorable essay on the close degree of relationship between the floras of Japan and eastern North America respectively, as compared with the relationships between the floras of eastern North America and Europe, and between those of western North America and eastern Asia. I allude now to the vegetation of the temperate zone as distinguished from that of the arctic zone, in which there is a greater continuity of land and a much more uniform flora. The results of Gray's investigations showed that a considerably higher percentage of allied species inhabit Japan and eastern North America than inhabit western North America and Japan, or Europe and Japan. The number of identical species known at that date to be native both of Europe and Japan was rather greater than the number of identical species in eastern North America and Japan, but these consisted largely of species ranging from western Europe to eastern Asia.

The late Professor Miquel sought to minimize the importance of Dr. Gray's deductions, on the ground that many of the assumed identical species were different; but, whichever way we view it, there is no disputing the fact of the existence of numerous genera in the floras of both eastern North America and eastern Asia (China and Japan) that are not represented in the present flora of Europe, though there is evidence that some of these genera, at least, formed part of the pre-glacial vegetation of Europe.

Since the appearance of Gray's essay the flora of Japan has been more exhaustively investigated, and the immense botanical collections made in central China by Dr. Augustine Henry and others have revealed the existence of many other connecting links between the temperate floras of eastern Asia and eastern North America.

Among these discoveries none is of greater interest than the Chinese Tulip-tree. Almost everybody in England who is fond of trees is familiar with the North American Tulip-tree, which has no counterpart in its curiously truncated leaves among the trees hardy in Britain. Indeed, this type of foliage is not very closely imitated in any other genus of plants throughout the world; most nearly, perhaps, in some species of Passiflora.

In 1875 Dr. Shearer sent leaves of a Tulip-tree from China to Kew, collected on the mountains near Kiukiang, in the province of Kiangsi, in about the latitude of Ningpo, but between five and six degrees westward. Mr. Le Marchant Moore published an account (*Journal of Botany*, 1875, p. 225) of Dr. Shearer's collection of Chinese plants in which these leaves were found, and we learn therefrom that Dr. Shearer regarded it as a native of the region where he collected it.

In 1878 Messrs. Veitch, of Chelsea, presented to the Kew Herbarium a collection of dried Chinese plants made for them by Mr. Maries. This collection contained one small specimen of the Chinese Tulip-tree. It is quite young, neither the leaves nor the flowers being fully developed. Mr. Maries collected it near Kiukiang, from a tree growing near a temple; and in a note accompanying the specimen, he states that it was a fine spreading tree with green flowers, but he regarded it as inferior to the American. With regard to the color of the flowers, that was probably due to their very young state, and the same may be said concerning their small size. Still the material was insufficient to decide whether it was specifically different from the American, and I accordingly published it as a doubtful variety under the name of Chinense in the *Index Floræ Sinensis* (*Jour. Linn. Soc.*, xxiii., p. 25).

Early in the present year Dr. Henry sent to Kew copious completely developed specimens, confirming the view that it is the same species as the American, and not distinguishable, even as a variety. Judging from the specimens, the Chinese Tulip-tree presents exactly the same kind of variation as the American; the foliage of young or vigorous trees being much larger and more deeply lobed. Dr. Henry collected specimens on the mountains both north and south of the River Yangtze, in the province of Hupeh. At Paokang he found it forming a spreading shrub, six feet high, at an elevation of 6,000 feet. At Chienshih he collected flowering specimens from a tree thirty feet high, and leaves from a young tree in the same locality are a foot across in either direction. It bears a Chinese name signifying goose-foot-leaved Catalpa. The localities where Dr. Henry collected the Tulip-tree are between 300 and 400 miles westward of Kiukiang, a region previously all but unknown, botanically, beyond the banks of the Yangtze River.

French Parterres.

THE Luxembourg palace, one of the finest and most famous buildings in Paris, was begun by Marie de Medici in 1615, her architect being Jacques de Brosse. A smaller palace, razed to make room for it, had been owned for a time by the Duke of Piney-Luxembourg, and hence the name of the existing building. For many years during the present century it contained the State collections of modern art; but these have been removed to a new museum in the gardens near by, and the palace is now the Senate House. Our present object, however, is not to describe the palace itself or the large and beautiful gardens which surround it, but simply to call attention to the method of planting shown in the foreground of our picture (see page 55).

We spoke not long ago (vol. ii., p. 590) of the bad taste displayed in many French parks where bright, formal flower-beds and isolated tropical plants are profusely scattered about, with no regard to the main lines of the design or to the general effect which these were intended to produce. But such mistakes, frequent though they are, should not be taken as representative of the current level of gardening-art in France. Especially where the design is itself formal or semi-formal in character, the most perfect good taste and a keen feeling for harmonies of line and color are constantly revealed; and strangely enough, it may seem, the treatment is then apt to be less strictly formal and mechanical than in the essays of other nations.

The chief features in many of the small parks of Paris, and in those parts of larger grounds where there is close contact with architectural forms, are straight narrow paths and rectangular grass-plots, kept free from all scattered plants or beds, but encircled by long beds planted with a great variety of hardy flowers and shrubs. Such are the small spaces which surround three sides of the Louvre at the end where it faces the church of St. Germain, and many parts of the gardens attached to the royal suburban palaces as well as to the Luxembourg. The chief point with regard to the arrangement of the flower-beds is that, while symmetrical, it is not formal, either as regards the selection and arrangement of the plants or the method of their cultivation. Shrubby perennials—standard Roses, dwarf and low Standard Althæas and Persian or Chinese Lilacs being the favorites—are set at regular intervals along the centre of the bed, its ends being commonly marked by rather taller specimens. Between these, conspicuous annuals are set, and then the bed is filled to its edge with a varied mass of more lowly-growing flowers. In August and September there might be noted among the taller annuals Dahlias of different heights, Gladioli, Cannas, Asters and Bush-Daisies; and, among the others, Geraniums, Tuberous Begonias, Lobelias and Lantanas, with Centaurea, Coreopsis and *Gaura Lindheimeri*. These last were not mingled heterogeneously as isolated specimens, and neither were they clipped and restrained to make formal patterns. A little clump of each was carefully placed with due regard to the habit and the color of its neighbors, and then the whole mass allowed to grow in free luxuriance. Particularly pretty effects were produced by mingling red with white Geraniums, or by contrasting the red ones with a clump of white Centaurea; and, again, by allowing a pale Heliotrope and a yellow Lantana to interlock their

sprays. The blue Lobelias were carefully distributed so that they did not offend the eye by contrast with inharmonious hues; and, in general, excellent use was made of all the white flowers to separate and relieve those of vivid colors. In certain other French towns the grass-plots sometimes showed a central bed of flowers or foliage-plants, while shrubs were set near their angles; but no such instances were noticed in Paris, and the effect is far better when the grass furnishes a perfectly quiet background for its brilliant border.

Of course the spring and early summer aspect of such a border is different from the one we have described; but it must be equally charming, especially as then most of the standard shrubs would be in bloom. From the artistic point of view these beds are infinately better than the flat pattern border; they are less mechanical in themselves, and, so to say, furnish a distant view more effectively, and they give the chance to use a great variety of beautiful flowers instead of only a few sorts combined with showy foliage-plants. From the practical point of view their superiority is as manifest. The standards, of course, are permanent; there is much less cost for wintering the other material, and much less labor in its arrangement and its subsequent care. After the summer planting has been done no care, indeed, is needed but watering and the occasional clipping of a plant which has run out too far over the grass. No one could question the beauty of the system who saw it last summer where it was most extensively and beautifully used—in the new gardens which occupy the former site of the Tuileries and connect the courtyard of the Louvre with the old Tuileries garden. Here acres were laid out with straight walks, grass-plots and long flower-beds, the lines being sufficiently varied to prevent monotony; and even when a large flower-bed stood by itself at the intersection of paths, it was arranged in a manner similar to that shown in the borders. The free beauty of the many flowers was enchanting as one passed by the successive beds; and the effect of the whole was harmonious yet brilliant in the extreme, and admirably adapted to the neighborhood of the stately buildings. In this case, and, indeed, in most others, the beds are not protected by the railing which in the Luxembourg garden somewhat injures their effect, but are merely divided from the walk by a narrow strip of grass, or at times by two such strips with a line of gravel between them.

Such borders are called by the gardener "French parterres," but it will be a pity if their use is long limited to France. Of course they too would be inappropriate as features in a natural landscape-design, but we often employ designs of this sort when formal arrangements would be better; and in these cases the graceful and varied symmetry of the French parterre strikes the happy medium between over-freedom and over-rigidity. With the great number of hardy flowers and shrubs at our disposal it ought to be easy—if, indeed, we possess an equal feeling for color harmonies—to exceed even the beauty of recent Parisian essays.

Californian Palms.

THE most remarkable arboreal feature of the deserts of southern California is the Washingtonia. It is as pre-eminent in its arid home as the Sequoia is in the forests of the Sierra, which it further resembles in growing only in a limited area. Perhaps the comparison may be carried further, for as the "Big Trees" now living are but the lingering giants of a vanished forest, so it is probable that these Palms are the scattered descendants of a more abundant race that once occupied the borders of the arm of the Californian Gulf which filled formerly the bed of the desert they now inhabit. We find them further north and west, at Whitewater, at an altitude of 1,126 feet. Thence the desert, broadening into a wide valley, falls rapidly, till at Indio, only seven miles away, it is twenty feet below the sea level, and at Frink's Spring, twenty miles further east, it is 260 feet below. In this depression the lingering waters formed a salt lake so recently that the record of its slowly receding levels is still visible in the discolorations of the cliffs which in places once formed its shore. It is along the hills which border the bed of this extinct sea that the most extensive Palm-groves are found, while scattering trees mark the direction of the channel which once led to the gulf.

These considerations may explain the anomaly presented by this Palm of being the only arborescent species in the United States which grows at any great distance from the sea.* Its station at Whitewater is the northern limit of Palm growth on the western side of the American continent, more than a degree further south than is reached by the *Sabal Palmetto* on the eastern coast.

* In Lower California, where it is found, Washingtonia is also a littoral species.

The Southern Pacific Railway runs through the desert I have mentioned, and between Indio and Seven-Palms stations some large groves of Washingtonias can be seen at the bases of the hills, a few miles to the north. A surface overlaying water, brown with alkali, produces here strips of damp soil, whitened with saline incrustations, which coat even the stems of the salt grass (*Distichlis maritima*) which spreads a sod of dingy green, grateful amid the surrounding bareness. Here the Desert Palm finds a congenial soil, for it is an oasis plant, and requires moisture for its roots. Though the most accessible, these are not the most satisfactory groves to visit. The number of really fine specimens here is not great, and most are badly damaged by fire. Their open situation exposes them to the full force of the desert siroccos, so that they have a gaunt and worn look, as if the struggle for existence had been hard. A smaller but much finer group is to be found in a sheltered cañon of the San Jacinto Mountains, some ten miles south of Seven-Palms station. Following a short distance the slender stream of clear water that runs through the narrow bed of this cañon, a more open place is reached, floored with wet sand in which lie half buried great angular fragments of granite. Here are growing a hundred Palms, mostly in the sand, but a few on the steep hillsides. There are some noble trees here, and the whole grove has an aspect of thrift.

Dr. Parry tells us* that the Desert Palm was discovered by the botanists of the Mexican Boundary Survey, who supposed it to be the Palmetto of the Atlantic coast. However, no mention is made of it in the report, and its first appearance in botanical literature is in the Smithsonian Report for 1860, where Cooper refers it doubtfully to *Brahea dulcis*, Mart. Then Herr Wendland, the distinguished Palmographer of Hanover, placed it in Prichardia, as *P. filamentosa*. Later, erecting for it a new genus, he called it *Washingtonia filifera*, fittingly reviving for the generic name one formerly bestowed on the Sequoia, but which the law of priority did not permit that genus to stand. The change in the specific name was less happy, as the strict construction of the recent reformers of nomenclature will demand that it be changed to *filamentosa*. Somewhere it has also picked up the name of *Brahea filifera*, by which it is usually known in horticulture. Its common names in California are Desert Palm, Fan Palm, or sometimes San Diego Palm, from its growing wild, in the United States, only in that county, and not in San Bernardino, as is usually stated in botanical works.

Seventy-five feet is probably the greatest height reached by the Desert Palm. The top is crowned by a cluster of light green leaves, whose stout stems, deeply channeled and beset along the edges with hooked spines, are eight feet, or more, in length. The plaited blades are some four feet in diameter, gladiately cleft at the edges, which are abundantly furnished with long, thread-like filaments. The leaves gradually turn down with age, until at last, layer over layer, they surround the trunk with a dry thatch, which descends in a regular cone from the verdant crown to the ground. This makes an admirable natural protection to the trunk from the scorching heat and drying winds of the desert. Unfortunately most trees have been deprived of this mantle. Its inflammable material is easily kindled by an accidental fire, and is an almost irresistible temptation to the passing vandal; but the most destruction is attributed to the desert Indians, who are said to burn the dry leaves that they may more easily gather the fruit. That any plants survive this ordeal of flame is strong evidence of the vitality of the species. No endogen could live through such a martyrdom. But of all the Palms of a fruiting size growing in the Colorado Desert very few have escaped it. I remember seeing only one tree, and that not over twenty feet high, with its protecting thatch uninjured. Naturally it would persist certainly many years. On cultivated trees, where the dead leaves are kept cut off close to the trunk, their fibrous bosses adhere so long that not more than four feet at the base will be free from them in a twenty-year-old tree. The bark is then seen to be gray, with close transverse fissures. The wood is fibro-vascular, with a specific gravity of .51.

A mature tree produces in June three or four large panicles of small scorious flowers. The stout terete peduncle ascends from the axil of a leaf near the centre of the crown, and is of the length of the petioles, so that the ultimate divisions droop over the blades. Gradually the peduncle declines, till, in September or October, the ripe fruit hangs pendent over the mass of dead leaves. Each cluster produces some ten pounds of fruit, the size of a large pea, with a thin, sweetish pulp and a bony seed.

The Desert Palm was early planted at the old Spanish mis-

San Francisco Bulletin, March, 1881.

sions, and some fine specimens still remain. One of the best is in the grounds of Mr. T. H. Ramirez, in Los Angeles, and is now fifty years old. A careful estimate of the height, made recently by the Rev. J. C. Nevin, is as follows: Height of living leaves, 14 feet; mass of dead leaves,* 10 feet; trunk, 34 feet; total height, 58 feet; circumference three feet from ground, 10 feet 10¼ inches.

The same tree was measured in 1880 by Dr. Engelmann, who estimated the height as substantially the same, and found the circumference to be only four inches less.

A tree growing on Second Street in San Bernardino, twenty-two years from the seed, measures: To the leaves, 22 feet; roof crown, 10 feet; total height, 32 feet; circumference three feet from ground, 9 feet 2 inches. This tree has produced flowers and fruit for the first time the present year. During the last few years many thousands of these Palms have been planted in southern California, which in time will become notable features in the landscape.

So far as is actually known, the Palm already described is the only one indigenous in California, or, indeed, anywhere in the United States west of the Atlantic and Gulf coast-regions. There are, however, some indications that other species may be waiting discovery. Two species of Erythræa are near our borders. *E. edulis*, Wats., inhabits the island of Guadaloupe, off the coast of Lower California, while *E. armata*, Wats., comes within thirty miles of the boundary on the Mexican side, and may be found in some yet unexplored cañon on the American side.

Ten years ago Mr. W. G. Wright obtained from the desert Indians a few Palm-seed of two different kinds, which appear to belong to no known species. They were represented to have been procured in the neighboring desert, but the most zealous efforts failed to lead to the discovery of the trees. There is some reason to think that they may have been brought from Mexican territory.

Washingtonia robusta, described by Wendland in 1883, is also supposed to be Californian, but its origin and character are alike doubtful. It was founded on some young plants raised in a Dutch nursery, the seeds of which were supposed by the proposer of the species to have come from the "Valley of the Sacramento River, in California"—an obvious error. Again, "M. Roezel is said" (by E. André in the *Revue Horticole*) "to have gathered the fresh seed in Arizona." It is quite certain that no botanist is known to have seen an indigenous tree. Seed-collectors, however, are more fortunate, and are able to supply abundantly the market with *W. robusta* seed, which has no apparent difference from that of the common Desert Palm, except its higher price. The published characters of the proposed species show no important points of difference from the better known one, and, indeed, are hardly sufficient for more than a garden variety. May not the seed from which the original plants were raised have been gathered from a *W. filifera* having individual peculiarities that impressed upon its progeny the minor characteristics by which they seem to differ from the ordinary form? Greater variations are procured by seed selection by cultivators, and among plants growing wild, marked individual differences are not uncommon. At best, this species is a very obscure one, and it is to be hoped that more light may be thrown upon its true character.

San Bernardino, Cal. *G. B. Parish.*

New or Little Known Plants.

Kalanchoe carnea.

THIS South American plant,† of which a figure appears on page 53, although it has suffered, perhaps, like most horticultural novelties, from over-praise, seems really an important and valuable addition to winter-blooming plants.

Like the Crassulas, to which Kalanchoe is very closely related, *K. carnea* is a very easy plant to manage. The seeds sown in the early spring will produce plants which will flower at Christmas-time. The seedlings may be potted during the summer or may be planted in the open ground and lifted and potted at the appearance of frost. The temperature of a warm greenhouse, in which the plants should get the benefit of as much sun as possible, will bring them into flower by the middle of December, or they may be retarded in a cooler temperature. The habit of this plant is fairly good, but it can be improved by pinching the end of the main stem early in the season, which will then throw up three or four flowering branches. *Kalanchoe carnea* flowers freely, and the flowers, which are pale pink, are so fragrant that a single cluster will perfume a whole house. Its blooming at a time of year when flowers are more scarce and more in demand than at any other season of the year makes it a desirable plant; and the fact that it can be treated as an annual or can be propagated from small cuttings adds to its value; as the plants can be thrown away as soon as they are out of flower—an advantage which will be appreciated by persons with small greenhouses in which space cannot well be spared for plants that have passed their productive state early in the winter.

Kalanchoe carnea is so easily raised and flowers so freely that it is suggested that it may prove one of the best flowering plants for cultivation in rooms which has been introduced for some time.

*All the dead leaves were cut away two years ago, and these have accumulated since.

† *Gardeners' Chronicle*, ser. 3, i., 211, f. 48, February 12th, 1887.

Foreign Correspondence.

The Gardens at Burford Lodge.

PROBABLY some of your readers who are interested in Orchids will like to hear something of a garden which has become famous wherever Orchids are grown.

Among amateur Orchid-growers in England, Sir Trevor Lawrence, President of the Royal Horticultural Society, has long been the acknowledged prince. He commenced about fifteen years ago to collect and cultivate Orchids in his delightfully situated garden under the lea of Box Hill, Dorking, in the county of Surrey, twenty miles from London Bridge. About five years later it was acknowledged that no collection in England possessed as much interest or testified to as much cultural skill as this; the health and cleanliness of the plants, the orderliness and convenience of the houses being such as were scarcely ever met with elsewhere. This may be said of Sir Trevor's garden to-day. There are and have been collections of Orchids almost if not quite as rich in number and rarity of species, but they have not lasted long, and the only English collection which may be said to rival Sir Trevor's at the present time is that of Baron Schrœder, at Egham, near Windsor. The marked difference between the two is that while the Burford Lodge collection contains almost every Orchid that is popular and beautiful it also admits many plants which have only a botanical interest. Sir Joseph Hooker recognized the exceptional services of Sir Trevor to horticulture by dedicating to him in 1886 the hundredth volume of the *Botanical Magazine*, and he associated with Sir Trevor's name "that of the distinguished lady from whom you directly inherit your love of plants and passion for gardening, the late Mrs. Lawrence, of Ealing Park, whose liberality and whose rich and beautiful conservatories were well set forth by my predecessor in the dedication to her of the sixty-eighth volume, published in 1842, of this work, and whose kindness to myself when a very young botanist, I shall ever hold in grateful remembrance."

Ealing Park about fifty years ago was probably the richest and most beautiful in England. Orchids, hard-wooded plants, stove plants, hardy trees and shrubs were cultivated there most successfully, as was proved by the place they took in the great exhibitions which were then held by the Royal Horticultural Society. In a description of this once famous garden, written at that time, mention is made of four houses, sixty-five feet by seventeen feet, filled with New Holland plants, amongst them magnificent specimens, four or five feet through, of such plants as Leschenaultia, Boronia, Gastrolobium, Pultenœa and Chorizema. Another house, forty feet by sixteen feet, contained nothing but Ericas, many of them large specimens of species which are not now known in English gardens. Reared in the midst of such surroundings, Sir Trevor could hardly help acquiring a great love for plants and taste for horticulture. When he succeeded Lord Aberdare as President of the Royal Horticultural Society it was rapidly sinking into ruin, and it had ceased to represent and lead English horticulture. Thanks, however, to the new departure decided upon soon after Sir Trevor's election to the presidency of the Society, it has been restored to activity and usefulness, and the Society is now rapidly gaining the respect and support of every one interested in horticulture.

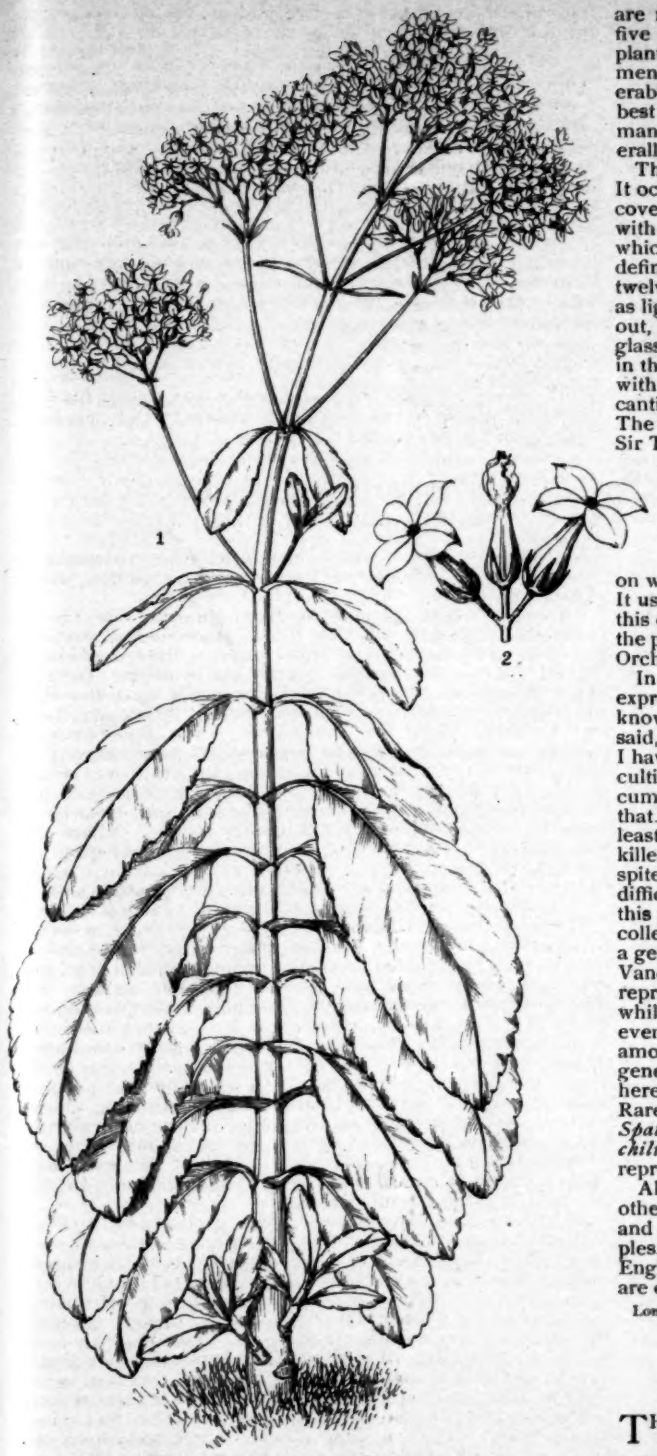

Fig. 14.—Kalanchoe carnea.—See page 52.

It is the boast of Sir Trevor Lawrence that he is his own gardener. He does not, however, deny to his men the credit due to them for the successes achieved in his garden, and amongst them to one who stood head and shoulders above all Orchid-growers of his time, the late Mr. Spyers. Mr. Spyers was a gardener by instinct as much as by training, and we are indebted to his extraordinary skill in arriving at the treatment best suited to many plants which had baffled others, or of which cultivators were in ignorance, for many Orchids which are now grown with ease. Mr. Spyers died suddenly about five years ago, when still a young man. A garden rich in plants and perfectly managed, where some half dozen young men are employed amongst the Orchids, must effect a considerable amount of good in horticulture by training men in the best methods of cultivation. In this way a few good, well managed gardens are of immense benefit to horticulture generally.

The garden at Burford Lodge is what would be called small. It occupies about twenty acres, a large proportion of which is covered with grass and plantations. These latter are filled with Ferns, Daffodils, Primroses, Bluebells, etc., through which moss-grown paths meander naturally, and are roughly defined by patches of Ground Ivy. The houses number twelve, none of them being large. In construction they are as light as possible, the wood-work painted white inside and out, being only strong enough to carry the broad panes of glass. In winter it almost seems as if there were more light in these houses than there is outside. The stages are covered with spar, and beneath them is planted Selaginella, Tradescantia, etc. There is absolutely no attempt at ornamentation. The houses are built solely for the plants, and are designed by Sir Trevor himself.

The collection of Orchids comprises almost every species and variety of any horticultural interest, and a great many which are termed "botanical Orchids." If there is a good and rare plant in the market it is almost certain to be secured for Burford Lodge unless it be already there. Sir Trevor is a liberal buyer. Any plant on which he has set his mind he gets, no matter what it costs. It used to be said that of every importation of Orchids into this country the best plants went to Sir Trevor's garden. At the public auction rooms, at the nurseries, wherever there are Orchids worth having, there Sir Trevor is a frequent visitor.

In his address at the Orchid Conference in 1885 Sir Trevor expressed the opinion that of the 5,000 species of Orchids known close upon 2,000 were in cultivation. "I can say," he said, "with regard to one particular genus, Dendrobium, that I have had in my own collection upward of 100 species under cultivation at the same time. There is another curious circumstance to be noted in connection with Orchids, and that is, that I do not see, in the case of most of them, that there is the least reason why they should ever die . . . unless they are killed by errors of cultivation." Many growers find that, in spite of the most careful treatment, a great many Orchids are difficult to keep in cultivation. Yet Sir Trevor's remarks on this point are to some extent confirmed by the contents of his collection, many of which have been in his possession almost a generation. Cattleya, Dendrobium, Cypripedium, Cœlogyne, Vanda, Odontoglossum, Oncidium and Masdevallia are each represented by scores, in some cases hundreds of kinds, whilst such genera as Epidendrum, Catasetum, Brassia, and even Pleurothallis, are not omitted. Hybrids have been raised amongst Dendrobiums, Cypripediums and several other genera at Burford Lodge, the fine race of Calanthe produced here being a special feature of this garden at this time of year. Rare plants, such as *Grammatophyllum speciosum*, *G. Ellisii*, *Spathoglottis aurea* (*Kimballiana*), *Renanthera Storeyi*, *Lissochilus giganteus*, and others scarcely known elsewhere, are represented here by large, healthy specimens.

Although famous chiefly for orchidaceous plants, yet the other departments of Sir Trevor's garden are well managed, and contain many choice and rare plants in well grown examples. Probably there is no other garden of the same size in England where so many beautiful, rare and interesting plants are collected together and grown so successfully.

London. *W. Watson.*

Cultural Department.

Notes on Grafting.

THE influence of stocks upon the scions or buds grafted and budded upon them is a subject which is often discussed and which is as yet very imperfectly understood. General experience maintains the theory that the leaves, flowers and fruit, as well as the woody parts, of a grafted or budded plant are essentially the same as those on the plant from which the scions or buds were originally taken, and that the plant food taken up by the roots of the stock imparts little or no influence of its own quality or character when transmitted to the cells, and through them, to the growing parts of the introduced graft or bud. On the other hand, the variations recorded by Darwin and others show that a mixture of qualities may take place, and the so-called "graft hybrids" are

exceptions which invite unlimited study and experiment with a promise of some interesting results.

Although the physiological reasons for these phenomena of growth are as yet so little understood, the visible results brought about by the practices of the horticulturist are often very striking and well marked.

Considered in its practical aspect it is surprising to find, after such a long period of usage, so few authoritative accounts indicating the full value of any stock for any special purpose. The French horticulturists seem, more than others, to have made advances in the practice of grafting and the study of its results, and some of their manuals and notices of the subject contain much valuable information for the amateur. Undoubtedly a great impetus has been given to the study by the practice, in recent years, of grafting the wine-producing grapes of France upon the roots of American species in order to check ravages by Phylloxera.

We know that when scions of some species are grafted upon stocks of an allied species, or sometimes even on a different plant of the same species, an increased vigor often results. Michaux states that the striped Maple (*Acer Pennsylvanicum*) when grafted on stock of the Sycamore Maple (*A. Pseudo-platanus*) increased to four times its natural size.

There is almost no limit to the possibilities of inter-grafting between plants of the same species; but how far grafting may be successfully and economically carried between different species or allied genera is a matter of which comparatively little is known. The practice of grafting the Pear upon stock of the Quince (*Pyrus Cydonia*) is one of the few cases where long usage has made the results familiar to all, and the difference between the Pear grafted upon Quince stock and a Pear grafted on seedling Pear-trees is well marked. Thus it has been found, as a rule, that successful grafting is fully as easy on Quince as on Pear-stock; that growth on the Quince-stock, though more vigorous the first year, becomes less vigorous in succeeding years than when grafted on Pear-stock; when grafted on Quince fruit may be produced in two or three years, while on Pear-stock it cannot be expected for at least five or six years. The fruit is usually finer, larger and relatively more abundant on Quince-stock, but the trees are dwarfed, and, as a rule, are short lived, while they become large and are comparatively long lived when grafted on Pear. It is also noticed that the graft on Quince increases in diameter much faster than the stock, and that the joining of the stock and graft is never so perfect as it is when the Pear is grafted on Pear stock.

Other points have been noted, and although much depends upon climate, soil and other conditions, and still more upon the character of some varieties of the Pear, the foregoing observations may be taken as an example of what is desirable in the knowledge of the value, as stocks, of hundreds of our trees, shrubs and vines. To know what stock will produce the best, longest lived plants of a variety grafted upon it, and, at the same time, give the most satisfaction in the abundance and quality of the flower or fruit, is certainly of great importance to the horticulturist. It seems to be true that certain stocks have an influence in hastening or retarding the leafing, flowering and fruiting of some plants; and the hardiness of some rather tender species often appears to be increased by grafting upon hardy stocks, probably because the wood becomes riper and better matured before winter frosts.

No regular series of experiments in grafting has as yet been attempted at the Arnold Arboretum; but Mr. Jackson Dawson, the propagator, has tried a great variety of stocks, and while, as was to have been expected, many of them have so far proved failures, others appear successful and worthy of notice.

The following notes made within a few weeks among the plants in the collections and nurseries are given, because they may be of interest to others working in the same direction. Among such young plants time alone will tell what the ultimate result and value will be.

One of the most interesting cases is that of five specimens of western Larch (*Larix occidentalis*), all growing near each other in the same soil and receiving the same treatment. Three of the specimens were produced from seed collected in Oregon and sown in November, 1881. Two of them are five feet and the other three and one-half feet in height, and all have stems three inches in circumference at one foot from the ground. The greatest spread of branches is three and one-half feet.

The other two plants were grafts taken from some of the above lot of seedlings in January, 1884, and grafted upon stock of a Japanese Larch (*L. leptolepis*).

These are now seven feet high, and have stems six inches in circumference at one foot from the ground. The greatest spread of the branches is five and a half feet. The point of insertion of the graft is not apparent in either plant. The seedling plants lose their leaves a little earlier, and are much more straggling in habit than the grafted specimens. Until within a few years it was not considered practicable to graft the Hickory. Young seedling and grafted specimens of these trees grown under the same conditions show, in some cases, a little advantage in favor of grafting. As yet the only stock used at the Arboretum has been *Hicoria ovata* (*Carya alba*). A variety of *Hicoria ovata* grafted in March, 1887, is now over two feet high, and of four seedlings planted beside it, the seed of which was planted in October, 1883, three specimens are two and one-half feet high and the fourth over one and one-half feet. The scion of the grafted plant was only three or four inches long when inserted in the stock. No marked difference in size or vigor has as yet appeared in seedling and grafted specimens of *Hicoria sulcata* (*Carya sulcata*) now six or seven years old. The Hickories offer a field for interesting experiments to determine which are the best stocks for grafting purposes.

Among the Oaks, the English Oak (*Quercus Robur*) is found to be the best for all purposes as a stock. The only plants measured for comparison were two plants, growing side by side, of the dwarf Georgia Oak (*Q. Georgiana*). One of these, grown from seed collected in Georgia in November, 1876, is four feet high, and the other, grafted on roots of young plants of *Q. Robur* in January, 1884, is now over seven feet in height. The stock in this case increases in diameter faster than the graft. The seedling plants have been occasionally partially killed in winter, while the grafted plants appear to sustain no injury.

Another interesting case is that of a south-western Ash (*Fraxinus anomala*), in which grafted specimens again show greater hardiness and faster growth over those not grafted. Of two healthy plants growing side by side under exactly the same conditions, the seedling plant is now four and a half feet high. The seed of this was collected in Utah and sown in 1874. The other plant is from a graft taken from the above lot of seed-grown plants and grafted on a seedling of the common White Ash (*F. Americana*) in February, 1882. It is now over nine feet high and appears vigorous and hardy, while the seedling plant has often been injured in winter. Other plants of these lots show the same proportionate rate of growth, vigor and hardiness. The various species of Amelanchier and Cotoneaster grow vigorously when grafted on the European Mountain Ash (*Pyrus aucuparia*), and the former appears to thrive fairly well on stock of English Hawthorn (*Cratægus Oxyacantha*), while the latter seems to do very poorly.

The Pear is commonly known to grow well on Cratægus, but, no doubt, a great difference would be found in the value of the various species of thorn for stock. Some varieties of Pear, budded upon strong roots of the native scarlet Haw (*C. coccinea*, var.), have been known to grow with extraordinary rapidity and to produce large crops of fruit within three or four years, but, in the cases which have come under my notice, the stems of the Pear-trees increased in size much faster than the stock, so that the disproportion became very great and the plants died while quite young.

The increased longevity and value of the Peach when grafted on Almond or Plum-stock is well known, and there is reason to believe that stocks of the different species of Plum would produce such varying results that they would be well worth testing comparatively.

The value and advantage of grafting many of our choice varieties of Roses is now generally conceded, but there are still differences of opinion as to the best stock for such purposes. The Dog Rose (*R. canina*) and the stock known as the Manetti are those in most common use. In recent years the Japanese *Rosa multiflora* of Thunberg has been employed to some extent as a stock, and, at the Arboretum, a Japanese species recently described by F. Crépin as *Rosa Watsoniana* has been used with satisfactory results. Its peculiar advantage as a stock over the old species in use and over *R. multiflora* (of which it may be a form) lies in the fact that the suckers and stray shoots from the stock may be at once detected by the slender, long, narrow leaves which are very different from those of all other Roses. Similarity of foliage often renders it troublesome to distinguish the graft of a Rose from the stock. *Rosa Watsoniana* appears to be less vigorous in habit of growth than the other kinds used for grafting purposes. The Japan Quince (*Pyrus Japonica*) grows poorly on the English Hawthorn, and has refused to adhere to Apple stock for any length of time. But the Chokeberry (*Pyrus arbutifolia*) thrives remarkably well on the European

Mountain Ash. The Hobble-bush (*Viburnum lantanoides*) has not always been found to take kindly to cultivation when transplanted from its native woods, and the advantage of grafting it on *V. dentatum* has already been referred to in a recent issue of GARDEN AND FOREST.

Arnold Arboretum. *J. G. Jack.*

Water Lilies for the Million.

COMPARATIVELY few lovers of flowers can indulge in the luxury of growing Water Lilies in an aquatic-house, and few can afford sufficient space in a greenhouse for such a tank as G. B. recommends in vol. iii., p. 20, of GARDEN AND FOREST. But these plants can be more cheaply grown; and I will give a few directions from my own experience, in the hope that many lovers of flowers will be induced to take up the culture of these beautiful exotics.

The Water Lilies of the tropics require heat to start them and to flower them successfully, the dormant bulbs starting at a temperature not below eighty degrees. Our summers are hot enough to flower them successfully out-of-doors, and plants sufficiently advanced to place in the Lily-tank can be purchased in May and June at $2.50 to $10 each. This is the barrier to more general cultivation. But seed of several varieties of Nymphæa are now advertised by leading houses at the moderate price of fifty cents a packet, and if care in cultivation is given fifty per cent. will, in many cases, germinate. Seed may be sown from January to March in shallow pots or pans of sandy soil. Those who possess a greenhouse will find no difficulty in maintaining the required temperature. The pots of seed should be placed in a shallow vessel filled with water, and directly on the heating-pipes, and kept dark or shaded till the seed germinates. Then all the light possible should be given. Those who do not possess a greenhouse may find some means whereby seed can be raised. A frame of common boards, six inches deep for the sides and ends, and covering with sheets of glass, would do for this purpose, provided a kerosene lamp was used underneath to keep the required temperature. When the seedlings are large enough to handle prick them off into seed-pans, using good loam, leaf soil and well rotted manure, in equal parts, rubbed through a fine sieve. Place the pans in shallow tubs, covering with about an inch of water, and it will not be necessary to place again directly on the pipes, but keep them in a temperature of about seventy degrees. They will not die in a temperature of sixty degrees, but the growth will not be so rapid. When the plants have made three or four leaves they may be potted singly into three-inch pots, using the same mixture of soil. At this stage they will require more room. Shallow tubs or other convenient vessels may be used to place the pots in, but no more than three inches of water should be over the tops of the pots, and they should be kept in the full light to prevent the leaves from being drawn. Where several plants are placed close together care must be taken when it becomes necessary to move them, or the leaves will get entangled. The water can be changed by simply adding more, and allowing it to run over. A good plan is to put an inch or two of sand in the bottom of the tubs to steady the pots, but the plants must not be allowed to make roots through into the sand.

As soon as the pots are full of roots they may be potted again into five-inch or six-inch pots, using good loam and well rotted manure. Three plants will be enough to place in tubs (kerosene barrels cut in two answer well). When the pots are full of roots they are fit to plant in their summer quarters. One plant will then be sufficient in a tub. Three can be planted if the tubs are to be sunk in a tank, but they will be crowded and the flowers will be smaller. If the plants are to remain in the tubs through the season, and not sunk in a tank, more space must be left for water. Use the same soil as when potting into six-inch pots, and finish off with two inches of clean sand. The plants will flower well in these tubs if kept constantly filled with water, but if at all vigorous, they will push their leaves over the edges of the tubs out of the water, and the sun will scorch them and check their growth. It is much better to place the tubs in a tank. The tank in which I have flowered Water Lilies successfully has been simply a hole of the desired dimensions, dug in a convenient and sheltered spot, yet open to the sun and having the sides and bottom concreted and finished off with Portland cement. An eight-inch brick wall would be more substantial, and consequently better, but my method may be used at first, and the brick-work left till a season's experience suggests improvements.

A very convenient size for a tank is five feet six inches wide, inside measurement, and not more than two feet deep. The sides should slope if concrete is used and an edge of a single brick will prevent the rim from being broken. If on the lawn keep the edge of the tank three inches below the

The Garden Front of the Luxembourg Palace.—See page 50.

ground level. This will allow a sod to be laid and the grass will cover the unsightly brick border. With a tank of these dimensions a garden-frame and sashes may be placed over it, and the tubs can be set in much earlier so that the sun's rays will warm the water several degrees and the season can be considerably advanced. The same protection can be given in the fall and Water Lilies may be had for Thanksgiving.

In such a tank I have grown in tubs *Nymphæa Zanzibarensis, N. Zanzibarensis azurea, N. Zanzibarensis rosea, N. alba candidissima, N. odorata rosea, N. dentata* and *N. Devoniensis*, and have cut flowers of the Zanzibarensis varieties ten and a quarter inches in diameter, with leaves which measured twenty-two inches in diameter. *N. Devoniensis* is a superb night-flowering variety, as is *N. dentata.*

N. alba candidissima is the queen of white Water Lilies, but is not fragrant. It is hardy, however, as is also *N. odorata rosea* and *Nelumbium speciosum.* The latter will not do well in a tub with the same culture as Nymphæa, but should be planted out in the Lily-pond or aquatic garden. All hardy Lilies should be planted in deeper water than is recommended for the Lily-tank, as they will not bear freezing. All varieties of *N. Zanzibarensis* and *N. odorata rosea* (the Cape Cod Pink Water Lily) have most delicately scented flowers and can be raised from seed.

No mention has been made of an overflow or draw-off in connection with the tank, for I have none. There is always a certain amount of evaporation going on, according to conditions of the atmosphere, and it is only necessary to keep filling the tank up with rain water or spring water. In emptying, I syphon with a length of hose having a fall of two feet in fifty. To keep the water clean and free from mosquito-larvæ, a few gold fish are useful and add immensely to the general appearance of the tank. *T. W.*

Staten Island.

Perennials From Seed.—II.

THE compost which is found suitable for all kinds of perennial plants is a mixture of loam and well decomposed leaf mould, in equal quantities, with the addition of a shovelful of charcoal dust to the bushel of soil. Should the loam be of a clayey nature, a shovelful of sand should be added. The influence of the charcoal is purely mechanical, but the benefits derived from its use cannot be overestimated. Before using it, we often found that, during a period of dull weather, the young seedling plants damped off in quantities, causing serious loss and disappointment. The charcoal has obviated this, but it necessitates a more frequent use of the watering pot. Before using, the soil should be passed through a quarter-inch sieve and thoroughly mixed, keeping a sharp look out for worms, which make trouble in the seed-pan. The soil, when in fit condition for use should by no means be dry, but it should not be so wet that any portion of it adheres to the hands. We use shallow seed-pans of two sizes, the smaller being four inches wide and two deep; the larger, seven inches wide and two and a half deep. Pans are preferable to boxes, unless the latter be new, as in old wood there is always a tendency to fungoid growth. The pans should be filled with soil to within a fourth of an inch of the top, and this should be made moderately firm and smooth with the bottom of another pan. The seed may then be sown evenly and covered with soil sifted through a fine sieve made of wire mosquito-netting. The soil left in the sieve should be used in the bottom of the next pan as drainage. Care must be taken not to cover the seeds too deeply; if they are barely hidden the covering will suffice. Many people advocate sowing small seeds without any covering. This necessitates shading from the sun, and if the seed be not quick to germinate, a mossy growth often covers the surface, through which it is difficult for small seeds to penetrate. Should this growth appear on the surface of the soil it may be smothered by sprinkling sand on it. When the seeds are sown the soil that covers them should on no account be pressed, as this renders germination very difficult with many kinds of plants, especially those that have small seeds. The pans should be watered as soon as sown, and after this must never become quite dry, neither must the pans be filled so full that the seeds can be washed out. Pots may be used in the absence of pans, but pots must be filled half their depth with broken crocks as drainage. Under the above treatment the majority of perennial plants may be raised from seed in a period varying from a week to two months, but, as has been already stated, many kinds are naturally slow to germinate, and the pans containing these may, during summer, be plunged in sand in a cold frame. When treated thus, less water will be required, and the soil will not become sour.

Passaic, N. J. *E. O. Orpet.*

Begonia Socotrana.—When this plant was first sent out by the Messrs. Veitch, of London, a few years ago, it was warmly praised by horticulturists, and many predicted a great future for it. Every one who saw it flowering for the first time, through the dismal fog and general desolation of a London winter, was charmed with the beauty of its flowers and the healthy luxuriance of its growth; and, if I remember correctly, there were a few plants of it grown in one of the private houses in the gardens at Kew for some time before it was sent out commercially, that were shown with great satisfaction to visitors of prominence. In beauty or utility it has not degenerated since that time, and it now stands amongst the best of a group of plants that has been extraordinarily prolific of good things for garden and greenhouse. The plant is held in high esteem for the bright pink flowers it produces through the winter. It is dwarf and stocky, growing from nine to eighteen inches in height, and the flowers are borne in clusters well above the characteristic circular leaves. The leaves are smooth, of a pleasing light green shade, and average about six inches in diameter. Its cultural requirements do not differ essentially from those of other Begonias, except in the matter of resting. During the summer months, when most other species are full of vigor, this one should be completely at rest; and then about the beginning of October, the roots should be shaken out and the plants repotted in a mixture of good loam and thoroughly decayed farm-yard manure in equal parts, with a little sand and leaf-mould. Little heat is needed until the plants show signs of growth, when they should be removed to an intermediate temperature, as such an atmosphere suits them while growing better than any other. If the plants are kept close to the glass they will assume a neater and more compact form than otherwise.

Chorizemas.—Where a continuous display of flowers is required through winter attention should be given to this group of plants, for they are most attractive in the greenhouse or conservatory. The most desirable species are all natives of Australia, and thrive most satisfactorily in an ordinary greenhouse among other plants. They are hard-wooded, and of free growth. The branches being somewhat slender, however, are all the better for the support of a trellis, or stakes. In most of the species the leaves are spiny and of a dark green color. The bright colored flowers resemble those of the ordinary Pea in form, but are rather smaller. What they lack in size is more than counterbalanced by quantity, as they are produced most abundantly on the tips of the young shoots. The prevailing colors of the flowers are red and yellow, in different shades and mixtures. The most useful species are *C. cordatum*, with flowers red and yellow; *C. Henchmanii*, scarlet; *C. ilicifolium*, yellow; *C. spectabile*, orange and red. There are many other species and varieties, but these are among the best, and they afford the widest range of color. Plants raised from seed, sown soon after it ripens, always give satisfaction; but it is also possible to raise good plants from cuttings of the young wood. Some care is necessary in rooting the cuttings as they are very liable to damp off. Their general culture consists of rather hard pruning when the plants have ceased to flower, and of repotting, when they commence to grow again, in a mixture of fibrous peat, rich loam, and sand in equal parts. Care should be taken to pot firmly and to keep the roots rather confined than otherwise, as the plants flower most freely when slightly pot-bound. Abundance of air and light is essential at all times; and in summer they should be placed in the open air, that the new growth may become thoroughly ripened. Before removal to their winter quarters the plants should be tied into shape; and it will add to the gracefulness of their appearance if they are afterwards allowed to develop their flowering shoots naturally. Some growers keep all the shoots tied-in severely, but this process adds nothing to the beauty of the plants.

Botanic Garden, Cambridge, Mass. *M. Barker.*

Seedling Chrysanthemums.—The perennial Chrysanthemums are so readily obtained from seed that even when one has a choice collection there is a great pleasure in trying a few seedlings with a certainty of vigorous, thrifty plants, a profusion of very varied bloom during the same season, and a possibility of a strikingly new and valuable variety. This is the proper season for sowing, which may be done in pans, pots or boxes, as the seeds germinate in ten days or a fortnight in moderate warmth. The young plants should be picked out in flats filled with a rich compost as soon as possible, and kept growing slowly at a moderate temperature, as well up to the light as possible. Shift them when necessary, the object being to secure strong, stocky plants with an abundance of good roots. Give all the air practicable

at all times, and as soon as possible harden them off without checking, so that they may be placed in cold frames to grow on slowly until chilling spring winds have ceased, when they may be planted out. The main objection to growing seedlings is that at flowering time the bushes take up valuable room, and, many being worthless, the space is more profitably occupied by varieties of approved excellence. This objection is well taken, but is obviated very readily. The most approved system among the growers now is to plant the seedlings in nursery rows, where they are easily cultivated, and allowed to grow away without removal of branches or suckers. A seedling Chrysanthemum is a wonderfully vigorous and thrifty plant, far exceeding in these respects a plant grown from a slip. In early June the plants are all numbered, and a few strong cuttings are taken from each and struck in a gentle bottom heat from manure. They root quickly, are shifted along into five or six-inch pots, are carefully cultivated and disbudded, and show, under this test, very closely their value. It will be seen that under this system no room is wasted, as the test takes little space; if the plant is of no value it is left out to be thrown away, but if worth propagating, one has not only the tested plants, but a good, vigorous bush full of branches and suckers, from which a large stock may be had at once, a very important point when one considers the value of new varieties of merit. The chance of securing a first-rate variety from seeds such as are ordinarily to be had is very slight, but the pleasure of watching the whole life of the plant—the germination of seed, the wonderfully thrifty growth and the amazing bloom, will repay any flower-fancier.

Elizabeth, N. J. *G.*

Correspondence.

The Knees of the Bald Cypress.

To the Editor of GARDEN AND FOREST:

Sir.—I have read the interesting essay of Dr. Lamborn in your issue for January 8th with great pleasure. My own observations on the knees of the Cypress do not seem to me reconcilable with Dr. Lamborn's hypothesis. The objections which they raise to it are as follows:

1st. The trees on the sandy uplands need the assumed support quite as much, if not more, than those which grow on the neighboring loam—often clayey—of the inundated bottoms, yet these upland forms always lack the excrescences.

2d. While a slight upward growing protuberance would doubtless strengthen the root, the tall column exhibited by many knees would have no value in this regard.

3d. The summits of the knees normally attain a height which brings them above the level of the water in the growing season; when they cannot attain this elevation the tree fails to develop. When, by the subsidence of the land at an earthquake, or the artificial flooding of the area by dams, the crests of the knees are brought under permanent water, the condition is fatal to the plant.

4th. The fact that the Cypress-knees serve as respiratory organs is made the more probable by the existence of sharp upward flexures of the roots of the Tupelo (see "Effect of permament moisture on certain forest trees" in *Science* (xiii., 176; March, 1889). These flexures, as there shown, are horse-shoe-shaped curves of the whole root, which, like the Cypress-knees, rise above the level of permanent water. On the Tupelo these structures are clearly of no advantage as anchors. Dr. Wilson and others have shown that similar structures exist in many plants.

I was aware that roots extended downward from the base of the Cypress-knees, but it seemed to me that the position of these roots was to be attributed to disturbance in the circulation and growth, brought about by the development of the knees rather than that the knees gave rise to the vertical roots.

Although I cannot at present agree with Dr. Lamborn in his main view, his paper seems to me a very important contribution to a discussion which promises to throw much light on the laws of plant development.

Harvard University. *N. S. Shaler.*

The Chinese Persimmon.

To the Editor of GARDEN AND FOREST:

Sir.—I read on page 612 of the second volume of GARDEN AND FOREST a note from one of your southern correspondents relating to Japanese Persimmons, which leads me to believe that you have only the Kiki of Japan, the Diospyros, Si-Tché of Bunge, in the United States. But there is another and very distinct Asiatic species, the *D. Sinensis* of the same botanist, which we cultivate at the Villa Thuret and which produces excellent fruit here.

The Chinese Persimmon is not as hardy as the Kiki of Japan, the leaves are more persistent and the habit is different. The flowers are smaller and yellower, the globular fruit does not turn red in ripening, and at maturity it is yellowish green and the size of an apricot, with sweet flesh, and generally contains several seeds. This species could, no doubt, be crossed with your Virginia Persimmon, a cross which might produce interesting and valuable results.

I have noticed that the seeds of Diospyros lose their power of germination almost immediately when they are exposed to the atmosphere, and, like Orange seeds, they should be preserved in the fruit until the planting season arrives.

Antibes, France. *C. Naudin.*

The Western New York Horticultural Society.

The Annual Meeting at Rochester.

THIS society, which is mainly composed of progressive and successful fruit-growers, held its thirty-fifth annual meeting at Rochester last week, and the proceedings were characterized by a business-like directness and expedition which is always expected there, but rarely seen in similar gatherings elsewhere. Practical and instructive papers and discussions, together with promptness, precision and system in the conduct of business, and all pervaded by unfailing good humor and fraternal feeling, constitute a positive educational force, so that these meetings have a direct value which is recognized and appreciated. Mr. Patrick Barry, who has been the efficient President of the society for more than thirty years, was unable to attend the sessions or to prepare his usual address. He sent a letter, however, offering his resignation on account of years and infirmities, but this was met with a unanimous declaration that so long as he could sign his name he must allow himself to be considered as the executive head of the body over which he had for so long a time and so acceptably presided. It was announced that Mr. George Ellwanger had given $1,000 to the permanent fund started by Mr. Barry last year for the society, and additional contributions increased it to more than $4,000. Abstracts of some of the papers and notes from the various Committee Reports and from the discussions are given below, and will be continued in our next issue.

FORCING VEGETABLES UNDER GLASS.

This was the subject of an admirable paper by Professor L. H. Bailey, the greater portion of which here follows: During recent years great progress in the forcing of plants has been made in two general directions: First, in improved methods of constructing and heating glass houses; second, in the increased knowledge of the demands of particular plants. Many garden vegetables are now grown during winter with profit, and the number is constantly increasing. This business of forcing esculent plants is a special business, requiring a particular kind of knowledge and careful attention, and therefore, in common with all special businesses, it is profitable when properly handled, and it is not likely to be overdone. As a rule, the most difficult crops are the most profitable. Yet there are no great difficulties attending the forcing of plants, as most people seem to suppose. The business demands only care and thoughtfulness. The demand for certain kinds of winter vegetables is steady and is rarely weakened by overproduction. Winter gardening is a business which, in a peculiar way, pieces out and supplements the horticultural operations of the year, superseding the unprofitable link of winter idleness.

The most important advance in winter gardening lies in the improved construction of glass houses; and this consists not so much in the mechanism of the building as in the application of the laws of nature to plant growth. And this improvement has resulted not only in producing better plants at lower cost, but it has reduced the cost of building the houses. The first feature of the improvement is found in the relations of the house to light. The gardeners of a century ago were aware of the value of light for forcing plants; but they were not successful in securing it. Efforts were made in the early part of the century to construct the roof at such angles as would catch the most rays of light, for it is well known that

if the sun's rays strike glass roofs at right angles the greatest economy of light will result. The roofs were, therefore, built with such slopes that they would stand as nearly as possible at right angles to the sun's rays in the coldest months of the year. It soon became evident, however, that in the houses of most approved construction the slanting rays of morning and evening must be largely reflected. Hence, there arose various special forms of roofs designed to present some surface at right angles to the sun at all hours of the day. The most popular of these was the curvilinear roof. In its ideal conception it demands a house circular or nearly circular in form. Various fluted roofs were also devised; the most famous of which was one erected at Chatsworth, by Sir Joseph Paxton. This latter style of roof demanded so much more material that much additional cost was incurred with little gain in the amount of light. The curvilinear roof, in its modified forms, is still popular for conservatories, but it is not adapted to the forcing of vegetables.

The old-fashioned circular and dome-shaped houses have come to be historical curiosities. They possess a radical defect; the roof is too high, too far away from the plants. We are now reversing the endeavors of the old gardeners by taking our plants to the light rather than by taking the light to the plants. In other words, we must get our plants near the glass if we demand quick growth. Fifty years ago Loudon was one of the first to perceive the defects in the old houses. "It is found," he says, "that the rays of light, after passing through glass roofs, lose their influence on the plants within in proportion to their distance from the glass. Hence, for general purposes a long, narrow house is the best." Loudon's statement was largely a prophecy, and we are reaping the realization of it. The ideal form of a forcing-house is one which is long, narrow, low, and more or less flat. It is more economical in construction than the old style of house, while the results obtained are incomparably better. Every gardener knows that if he would grow good and profitable crops of any low vegetable in a house he must get his plants near to the glass. The low and narrow houses possess other advantages over the old-fashioned circular and rectangular structures. Or, to quote Loudon again, "there is another reason in favor of narrow houses where perfection of growth and economy are objects, which is, that a considerable portion of the heat by which the temperature of hot-houses is maintained, is supplied by the sun." Sun heat is better than artificial heat. The curvilinear form of roof is now combined with the long and narrow form of structure, and this gives a house of peculiar value for growing some ornamentals, because it gives sufficient height for them to grow without greatly increasing the height of the house. For the forcing of kitchen garden vegetables, however, this added height of the curvilinear roof is a positive disadvantage. And all curvilinear roofs are more expensive than direct roofs.

Of recent years we have also added greatly to the light in houses by the use of large panes of glass. The glass is also better than it was formerly. This improvement of glass lies: (1) In greater transparency, due mostly to greater thinness, and (2) In greater regularity in its surfaces. Early in the century panes 3 x 5 inches were largely used, chiefly because panes of this size could be made very thin and regular. When larger panes began to be used better results were not reached, simply because the surfaces of the glass were so uneven that much light was reflected and refracted.

The second feature of improvement is found in methods of heating. No subject connected with glass structures has been the occasion of such violent discussions during the last few years as the various methods of heating. The fact that these discussions exist is proof of progress, for agitation always means revolution or improvement. We are emerging from the old hot-water system into better and more economical methods. These later methods are steam heating and improved hot-water heating. The old style of cast iron pipes laid exclusively under the benches is being replaced by ordinary gas-pipe, whether the heat be applied by hot water or steam. In fact, the methods of piping glass houses are now almost identical in both systems. In either case the heat is carried from the furnace through one main pipe or riser which passes through the house near the top. From this riser as many returns are taken as are necessary, and the steam or water is returned to the boiler underneath the benches. About the only difference in piping for steam and hot water lies in a little more careful grading of the pipes for hot water, and the highest point in the hot water riser is usually at the further end of the house, while the highest point in the steam riser is approximately over the furnace. These systems of heating introduce a new principle into the method of forcing plants; a part of the heat is applied above the plants rather than being entirely applied as bottom heat, as formerly. This of itself presents some advantages. It allows of greater uniformity in the temperature of the house, in proportion to the extent of heating surface, because it supplies some heat near the glass where the greatest radiation takes place. The piping under the benches is so much in excess of that above them, that good bottom heat is secured.

The common question now among greenhouse men is, which is better, steam or hot water? A Yankee would reply by asking the question what is meant by hot-water heating? If the old system of hot-water heating is meant, then I should say unhesitatingly that steam is better. But if the questioner has in mind the more modern and improved methods of hot-water heating, then I should prefer not to answer for all cases. It is undoubtedly true that for small houses the modern hot-water system is the better; and it may be that it is better in all cases. For myself, however, I have preferred steam, and I am using it in my houses. I have no doubt that the ideal system of heating is going to be a combination of steam and hot water. In other words, the ideal system will use steam whenever or wherever steam is found to be better, and it will use hot water in the same apparatus whenever hot water is better, as in mild weather. In fact, most of our steam plants can be used almost equally well for hot water. Let us suppose that we have a low pressure steam heater and that our house is piped for ordinary steam heating. When running with steam, we simply keep the water low in the furnace, so that there is room above the water for the storage of steam. If, now, upon any day I wish to heat with hot water, I simply fill my furnace full of water and run my plant as before. The expansion of the water by heat will force it through the pipes as if it were steam. There are but two or three matters of detail which demand attention. Some provision must be made for the expansion of water beyond the capacity of boiler and pipes. This expansion is provided for by simply taking out of the riser or return near the boiler a three-fourths-inch gas-pipe and carrying up this pipe several feet into a tank. The higher the tank above the furnace, the greater will be the pressure upon the hot water and the hotter will the water become. Under a pressure of forty pounds, the water will reach a temperature of about 300 degrees, which is a higher temperature than is attained by steam under any ordinary pressure. A stop-cock, preferably a stop and waste, should be inserted in the small gas-pipe near its union with the main, in order to close the circuit when steam is used. If the boiler is supplied from water-works an expansion-tank is not necessary, unless the pressure is very great, for the water may be turned on permanently and expansion will simply back the water up into the water works system. In using the steam plant for hot-water heating, the safety valve must be fastened down to hold the water in. When steam is used again it is only necessary to draw off most of the water from the boiler and to close the cocks in the expansion-tank.

Inch gas-pipes are probably the best size to use in heating glass houses, because they present a greater heating surface than any other pipe which can be economically used. That is, small pipes and more of them is a better system than few large pipes. A more even and economical distribution can be secured by their use.

In practice it is found that twenty feet is about the maximum profitable width for a forcing-house. If a low house is desired, for forcing Radishes, Lettuce or other low plants, a much narrower house is advisable, unless it can be built upon a slope, where a two-thirds span can be used. Very narrow houses contain so small a body of air that the temperature is more difficult to regulate than in a wider house. The house should be low. The sides range from two to five feet, and the gable stands from seven to twelve feet above the surface in our best modern forcing-houses. The glazing is done upon permanent sash-bars, as more light can be secured by this method than by roofing with sash. The details of construction must be adapted to individual circumstances; but the old bugbear of great expense may be dismissed. I have built two good houses, each twenty by sixty feet, inside measure, at a combined cost of building, including heat, of about $1,500. And these houses are much better than common commercial forcing-houses, which can be built much cheaper than this.

In conclusion, it may be said that there are six general essentials to successful forcing of plants: (1) Bottom heat. (2) Abundance of light. (3) Proximity of plants to glass. (4) Fresh air. We must outgrow the notion that we ventilate simply to cool off the house. The primary object of ventilation is to give fresh air, and this should be secured without allowing drafts upon plants or changing the temperature of

the house suddenly. (5) Humidity of atmosphere. (6) Adaptation of methods to change of habits in plants. Plants rarely, if ever, maintain the same habit of growth when forced as they naturally possess out-of-doors. The struggle for light is the chief cause of change of habit. It is the adaptation of methods to this change in habit and rapidity of growth which largely determines the good gardener.

THE CLEMATIS DISEASE.

A most valuable paper was one by Professor Comstock, of Cornell University, explaining the cause of the fatal Clematis disease, which has so long baffled investigation. One nurseryman in Ohio estimates his loss last year from this disease at $4,000, and the subject is so important that we reproduce the paper almost entire:

The more striking symptoms of this disease are (1) the leaves suddenly turn black; then (2) the vine dies down to a spot near the root that has a diseased appearance. Frequently, after a period of rest, the plant will take a fresh start, sending up a new shoot from the root. But the life of this growth is of short duration; for the plant that once dies down is doomed to perish soon. At first sight there are strong reasons for locating the seat of the disease in a limited section of the vine near the ground. This section has a diseased appearance; the plant dies down to this point; and later fresh shoots are sent out from below it as if the roots were healthy. It was doubtless these reasons that led Professor Arthur to look upon a fungus which he found in the plant at this point as the cause of the disease. But my studies of the past two years have convinced me that this fungus simply accompanies the disease, and that the cause of it is something very different. Every grower of Clematis has observed knotty growths of varying size upon the roots of some of the plants. It is in these knots, or galls, that the cause of the disease is to be found. If a gall be cut across and the section examined with a hand lens of moderately high power, there will be found embedded in the abnormal plant growth small, pear-shaped bodies of the same color as the cut surface of the root, but rendered easily visible by their smooth, polished surface. These pear-shaped bodies are found on careful examination to be sacs containing a large number of eggs. In fact, each sac is the body of a worm which has become greatly distended by the eggs which have been developed within it. It is these worms cankering the roots of the plants that cause the disease. And, as they multiply rapidly, when soil becomes infested by them the spread of the disease is terrible. I know nurserymen, who a few years ago produced Clematis plants by the tens of thousands, who have been forced to give up their production on account of this disease.

But more unfortunate than the serious injury caused by these worms to the Clematis, is the fact that they do not confine their attacks to this plant. A very large number of species are liable to be attacked by them, and consequently the trouble cannot be overcome by simply suspending the production of this one plant. It is a question in which every horticulturist, whatever he produces, is interested. It seems as if the horticulturist was fated to ever have new battles to fight. He became thoroughly aroused long ago to the warfare against insects; somewhat later he awoke to the appreciation of the importance of plant disease caused by fungi, and now we find another group of animals much lower than insects preying upon plants to a serious extent.

The animals in question are worms, belonging to the order known to zoölogists as the Nematodes, or thread-worms. The species of this order that have attracted the attention of gardeners abroad are commonly known as eel-worms. A good illustration of the order is the "vinegar eel," a minute creature often seen wriggling near the surface of vinegar. The majority of the species are, like the "vinegar eel," harmless, feeding upon dead or decaying vegetable matter. A few species attack growing plants. The best known of these to readers of the English journals is the one that causes ear-cockles in Wheat in England, and the tulip-root of Oats in the same country; but more important than either of these is the species that infests the Sugar Beet in Germany. That species and the one infesting Clematis are closely allied, and differ from other forms in the body of the female being pear-shaped, as already described above; but the two species differ in that the one infesting Sugar Beet does not cause the plant to form galls like that infesting Clematis.

Both sexes of this species when young are very minute, requiring a high power of the microscope to detect them, and are thread-like in form. They can crawl very rapidly, and it is in this stage that the species is spread from plant to plant. The males undergo some remarkable changes, but are always more or less thread-like. The females, after finding lodging places in the tissues of the roots and becoming fertilized, become distended in a remarkable manner, assuming the pear shape already described, and becoming of sufficient size to be seen by means of a simple lens.

The range of plants infested by this species of Heterodera is very great. It is already known to attack at least seventy-five species of plants belonging to widely different orders. It is found in diseased roots of Roses; it is very common in Begonias; it does a good deal of injury to Cucumbers, Potatoes and Tomatoes. In the south it is especially destructive to Peach, Grape and garden vegetables, including Cabbage, Turnip, Lettuce, Beet, Parsnip, Egg-plant and Melon. This wide range of food plants is the most discouraging element in the treatment of this disease. In fact, I do not feel that we are in condition to name with any great degree of certainty any plant on which the worms cannot live. In this direction lies an important field for future experiments. When such plants have been determined, the cultivation of them on infested ground, and thus starving the worms out, will be the most practicable way of meeting the evil in the case of field crops.

A German writer, Professor Kuehn, strongly urges the use of what he terms catch-plants against the species that infests Sugar Beet. He has used Rape as a catch-plant. This is sown on infested fields; the young worms in the soil penetrate the roots of the plants. After the roots have become infested, but before the females have begun to produce young, the plants are pulled up and destroyed. In this way several crops of Rape are produced upon the infested field one after another in the same season, each succeeding crop tending to entrap the worms remaining in the soil. But, obviously, the use of catch-plants is a very expensive method of fighting the pests, and yet it is an expense that would be gladly met by the owners of valuable lands if they could feel sure of such results as these reported by Professor Kuehn. Still I think we are hardly ready yet to give definite directions for the use of such plants. It seems to me, however, that the growers of Clematis can at once, without waiting for further discoveries, reduce their losses to the minimum by a little care in the management of their plant-houses, in the procuring of potting soil and in the choice of fields for planting out.

The conditions in some of our establishments where Clematis is grown are those most favorable for the multiplication and perpetuation of the disease. The benches upon which the pots stand are covered with gravel or coal ashes, which is changed at infrequent intervals; the roots of the diseased plants pass through the hole in the bottom of the pot and ramify in the gravel or ashes, and the worms follow the roots, infest them, and this soil becomes a breeding place for the pest. When another lot of plants is placed upon such soil, obviously in a short time these plants will become diseased. It is recommended, therefore, that between each two lots of plants the soil be carefully removed from the benches and placed where it will not contaminate other crops; that before renewing the soil the benches be thoroughly washed with lye so as to destroy any worms that may be lodged in the cracks; that the soil for potting be carefully selected so that it shall not be a source of infection; that in planting out great care be taken to make sure that it be done on land which is free from this worm; if any roots of any kind are found in the soil which have unnatural swellings upon them, the field should not be used, as there will be a strong probability that such swellings are galls made by this worm; and finally, until a grower is able to produce only healthy plants he should not use root-grafts, for roots that are apparently healthy often contain the worms.

THE EMBELLISHMENT OF PUBLIC PLEASURE-GROUNDS.

The paper on this subject, by Mr. William McMillan, Superintendent of the Buffalo parks, was one of substantial merit, and its value was made so clear by impressive delivery that the effect on the audience was striking. After speaking of the necessity of having a consistent plan, Mr. McMillan insisted upon thoroughness of construction; everything should be of the most durable character, since the admission of makeshift and temporary work always proves costly in the end on account of the greater cost of maintenance. In a consistent plan all features will not only be in proper harmony with each other, but nothing will be introduced that cannot under ordinary municipal conditions be easily maintained in good condition at all times. For instance, the location, width and alignment of drives and paths will combine to the best advantage, gracefulness of proportion and convenience in use. The sinuosity of a walk, if unnecessary or unnatural, will surely tempt pedestrians to make a cross-cut track at every

bend. This will not only disfigure the grounds, but encourage disorderly usages that will gradually lead to other encroachments, until the original design be obliterated and its ornamental value be utterly lost. For similar reasons, the more ambitious or pretentious any decorative feature may be, the greater the risk of incidental damage that will make it a mockery of the motive with which it was introduced. Whatever general type or special feature of embellishment may be desirable, the measure with which it can be fittingly maintained will be the best gauge of what may wisely be attempted. This measure will be of a different standard for public grounds from that current in well-kept private gardens. The conditions differ more widely than is generally believed. Private grounds are almost wholly free from a large class of petty trespasses that are the constant accompaniment of public use or occupation. Park policemen may be appointed to prevent such damage and to secure orderly behavior, but in practice they are often an expensive luxury more ornamental than useful. Trespasses that in the aggregate may be fatal to all decent management, taken singly may seem so petty as to be unworthy of notice. Stepping on forbidden grass, dodging out and in through bushy thickets, breaking twigs, picking flowers, peeling saplings, girdling Birch-trees, carving Beech-trunks, even downright stealing of small plants, or their wanton destruction, may be of daily occurrence without detection, or, if detected and gentle reproof be unheeded, sterner action will be resented and arrest be worse than useless. Take a flagrant case to court, and the plausible lies and special pleading that will be heard and believed will make the misdemeanor seem too trivial to occupy the time of the court.

Those untoward conditions make it prudent not to indulge freely in showy or costly ornamentation. Take, for example, the culture of Azaleas or Rhododendrons. When they are in bloom the temptation seems too strong for the average park visitor. They will be despoiled at every favorable opportunity, and soon the plants will be entirely destroyed, as from two to three years' growth of twig will go with every flower-truss that is plucked. Natural conditions of soil and situation suggest a sheltered and shady location, but there the risk of depredation is greatest. Constant police supervision is impracticable, and the safest place will be the most exposed and frequented; but there you must fight against sun and wind, drought and frost. Of the two evils you may choose the less, but only to meet constant vexation and disappointment and final failure.

After explaining why a formal and artificial scheme of planting may be the most effective in small city squares, Mr. McMillan argued against the use of trees and plants with highly colored foliage, where broad effects were aimed at, as unduly exalting the abnormal above the normal, the rare freak above the common type. It is surely false to Nature to do so, or to run to excess in the display of strange colors, however natural the tints may be. Nature is always temperate in the display of high color. The rainbow is evanescent. Dew-drops sparkle only at a certain angle of vision, and soon evaporate. A gorgeous sunset covers but a small part of the heavens, and lasts but a few minutes, and the exhibition is not opened daily or even weekly. For a week or so in autumn there is a brilliant display of colors in the foliage of trees and shrubs; but the duration of the brightest tints in any leaf is very brief, and the whole display is but "a fleeting show." Because we can admire these changing colors so much for a brief period as the foliage ripens, it does not follow that we could enjoy the display with equal relish if exhibited during the whole season of active vegetation. As a daily diet, it would surely satiate, and even nauseate, the most hungry appetite for high color.

Mr. McMillan's paper contained many other valuable suggestions, to some of which we shall refer in the future.

Recent tests indicate that London Purple may be more dangerous to foliage when used in spraying than Paris Green, because it sometimes contains more soluble arsenic.

In Chautauqua County 8,000 tons of grapes were produced last year, which, at so low a price as three cents a pound, were worth nearly half a million dollars. In Yates County 7,500 tons were produced.

Hyposulphite of Soda, though not a perfect remedy for the scab of Apples or Pears, is still the best that is known, and when a mixture of half an ounce to ten gallons of water is used it will destroy a large proportion of the fungus.

The high price of sugar materially lessened the demand for many kinds of fruit during the last season. This was particularly true of Currants, but the price of Strawberries was also affected because the preservers used comparatively few of them.

It was generally held that an orchard of Dwarf Pears is more profitable than one of standard trees. Dwarf trees had proved long-lived, yielded as good if not superior fruit, were less susceptible to blight and bore more regularly. Dwarf Pears could be planted on heavier soil—indeed they should not be planted on light, sandy ground, which is not naturally adapted to the Quince root. The Duchess had heretofore been used almost exclusively as a dwarf, but the Kieffer was now largely worked on dwarf stock, and the Anjou and Howell were named as varieties especially adapted to this treatment. One orchard of four and a half acres yielded 441 barrels of Duchess pears last season, which brought $1,906. The practice is to cut back severely every year and fertilize heavily.

The movement in favor of fruit-growers' institutes was commended because, it was argued, this industry was quite as important as others in which instruction was provided by the state. If dairy institutes are held in the grazing districts of the state to the advantage of butter-makers, cheese-makers and milk-producers, there is equal reason to suppose that local meetings for discussion in the fruit-growing districts at which experts in various branches of fruit-culture could read papers, would prove helpful. If it is essential to weed out from the dairies of the state unprofitable breeds of cattle, it is quite as important to discard unprofitable varieties of fruit. The average yield of apples in the state is less than one barrel to the tree, and individual trees under the best conditions have borne ten barrels and even more than twice ten barrels, according to the veteran Major H. T. Brooks.

Notes.

Trailing Arbutus was found, last week, in full bloom, in two places in the neighborhood of Mays Landing, New Jersey.

As evidence of the advanced state of the season in South Carolina, Dr. Mellichamp sends us a branch of the old *Morus multicaulis*, gathered on the 18th of January, with expanded flowers and full grown leaves.

A European correspondent, who has traveled in Ceylon, calls our attention to the fact that a plant mentioned in a notice of an article from *Macmillan's Magazine* on "Weeds" on page 611 of our last volume is not, as the English writer supposed, the blue-flowered Ageratum, but *Lantana curapavica*.

A correspondent from Minnesota writes that a Tamarac tree (*Larix Americana*) has lately been found which measured seven feet eight inches in circumference four feet above the ground, and was estimated to be 125 feet high. The largest Cedar (*Thuja occidentalis*), observed by the same correspondent, measured ten feet four inches in circumference at four feet above the ground, and was about seventy feet high. Both these trees grow near a brook of constant spring water, and in alluvial soil, rather stony.

A monster Elm-tree stands on the Avery Durfee farm in Wayne County, New York, between Palmyra and Marion. Two feet above the ground it measures thirty-three feet ten inches in circumference, and five feet above the ground twenty feet and ten inches. It is sixty feet to the first limb and the total amount of lumber in the body of the tree is 16,250 feet. Eighty years ago, when the farm was cleared, this tree was left as a landmark. It was then a giant among the surrounding forest trees.

About 20,000,000 pounds of prunes are annually produced in California, largely of the better quality, which are packed in fancy boxes like the high-grade French prunes. In our eastern cities the California fruit has sold, of late, in much larger quantities than the French, and at prices from three-quarters of a cent to one cent higher per pound. But between 60,000,000 and 70,000,000 pounds of inferior foreign prunes are annually imported, to be sold at very low prices to the laboring and mining population of all parts of the country.

According to the London *Times*, the largest market for Christmas-trees in Germany is Berlin, where, this season, 400,000 trees were sold, varying in height from two to thirty feet. At wholesale, the plants are bought by the *schock*—that is, in parcels of sixty, large and small ones being taken together as they come, at an average price of from about $5 to $5.50 per *schock*. At retail, trees not more than two feet high sell for twelve and a half cents. From seven to ten feet is the size most in demand, which brings from twenty-five to fifty cents, while twenty-foot specimens of fine quality bring $2.50 or $3. Almost all are Fir-trees, cut in the Hartz Mountains.